Case Report

Aggressive debridement and early antifungal therapy in the management of cutaneous mucormycosis: A case report with review of literature

Sebin Sebastian[1], Pushpendra Malik[2], Chander Bhan[3], M K Garg[4], Prakash Raj Ujjalsingh[1]

[1]Junior Resident, [2]Professor, [3]Assistant Professor, [4]Professor and HOD, Department of General Surgery, BPS Government Medical College , Khanpur Kalan, Sonepat, Haryana, India.

ABSTRACT

Mucormycosis is an infectious disease caused by fungi. The worldwide spread of coronavirus disease-19 did create a public health crisis, infecting millions of people and causing huge numbers of deaths worldwide. Cutaneous manifestations of mucormycosis can either be primary or secondary diseases. Clinical manifestations can vary from cellulitis, abscess, or ulcer. Standard management includes early diagnosis, surgical debridement, and antifungal therapy. Early initiation of antifungal therapy can lower mortality rates and improve the prognosis of patients. The estimated mortality ranges from 25% to 87%, depending on the site of infection.

Key words: Aggressive antifungal therapy, Coronavirus disease-19, Cutaneous mucormycosis, Early debridement

Mucormycosis is an infectious disease caused by fungi of the class zygomycetes. These are common environmental organisms that are not harmful to immunocompetent humans. They can cause rapidly spreading necrotizing infections in immunocompromised patients. The most common form is rhinocerebral mucormycosis. Histopathological examination (HPE) shows non-septate or minimally septate broad ribbon-like hyphae invading the blood vessels [1].

The coronavirus disease of 2019 (COVID-19) created a public health crisis, infected millions of patients globally, and caused a great number of deaths worldwide [2]. The COVID-19 infection can be generally divided into symptomatic and asymptomatic infections. The symptomatic condition is further divided into mild, moderate, and severe forms. The dermatological manifestation can be seen in 0.4–20% of cases and is often non-specific which includes erythema or urticarial-like lesions [3]. The cutaneous manifestation can either be a primary or secondary disease. In primary disease, the skin infection is due to direct inoculation, and in secondary disease, there is dissemination from other locations. Cutaneous mucormycosis can be seen in both immunocompetent and immunocompromised patients. Approximately 50% do not have overt immunosuppression but have undergone major antecedent trauma [4]. The clinical presentation appears as a single and indurated area of cellulitis that readily progresses to a necrotic lesion, resulting in the formation of abscesses and ulcers. The standard management of mucormycosis includes early diagnosis, surgical debridement, and early initiation of intravenous antifungal agents. Lipid formulations of amphotericin B are available, which decrease toxicity and improve the tolerability profile. These formulations produce tissue amphotericin B concentrations much higher than serum concentrations [5]. The underlying risk factors and disease processes should also be taken care of. The prognosis of mucormycosis is related to the timing of antifungal therapy as well as the degree of the underlying risk factors of the patient with mortality ranging from 25% to 87% depending on the site of infection. Repeated aggressive debridement and reversal of underlying factors can reduce the mortality associated with mucormycosis [6].

We report an extremely rare case of cutaneous mucormycosis where early antifungal therapy and surgical debridement can be lifesaving.

Access this article online	
Received - 21 October 2023 Initial Review - 04 November 2023 Accepted - 05 January 2024	Quick Response code
DOI: 10.32677/ijcr.v10i2.4318	

CASE REPORT

A 52-year-old female patient presented to the emergency department with complaints of right-sided gluteal swelling for 20 days, which was associated with on-and-off fever for 3 days. She also had a history of intramuscular injection at the same site 1 month before and was not a known case of any comorbidity.

On examination, there was a 20×20 cm swelling involving the right gluteal region with a central patch of gangrene. The surrounding skin was showing edema. A provisional diagnosis of injection site abscess versus necrotizing fasciitis was made.

Correspondence to: Dr. Sebin Sebastian, Junior Resident, Department of General Surgery, BPS Government Medical College , Khanpur Kalan, Sonepat, Haryana, India.

On the day of admission, her vitals were stable. But, in the course of the hospital stay, she developed shock and was transferred to the surgical intensive care unit where she was put on inotropic support. The patient was taken to the operation theater for debridement, incision, and drainage.

Intra-operatively, extensive wet gangrene was present along with the abscess cavity (Fig. 1a). Gangrene was seen extending up to the muscle layers. Post-operatively, the ulcer was showing no signs of healing. The ulcer started to expand into the surrounding skin and subcutaneous tissue. The patient was again taken into the operation theater for further debridement. A biopsy of the necrotic tissue was taken and sent for HPE (Fig. 1b). While waiting for the HPE report, the ulcer spread could not be contained. The patient was again taken for a 3rd time to the emergency operation theater for debridement. The HPE showed the presence of a fungal infection with a possibility of mucormycosis (Fig. 2).

The patient was started on liposomal amphotericin daily for 7 days. The results of antifungal therapy were magical. There was no requirement for debridement once antifungal therapy was started (Fig. 3a). The ulcer expansion stopped. The slough was reduced, and the granulation tissue started appearing on the 3rd day. By the 7th day, the ulcer was completely covered with granulation tissue, and no signs of expanding gangrene were present.

The patient also developed refractory hypokalemia during the initial weeks of post-debridement. This was managed by IV potassium supplementation on a daily basis. She also had anemia and required a transfusion of 12 units of packed red blood cell during the course in the hospital. Also, to fulfill the serum protein requirements, she was transfused 14 units of fresh frozen plasma in the hospital. After the second debridement, she suffered bradycardia and hypotension, which were managed by atropine and noradrenaline in the intensive care unit.

The patient was planned for skin grafting 2 months after the admission, and a split-thickness skin graft was performed. The uptake of graft was 100%, and the patient was discharged in a few days (Fig. 3b). She was followed up regularly on an outpatient department basis and does not have any complaints presently.

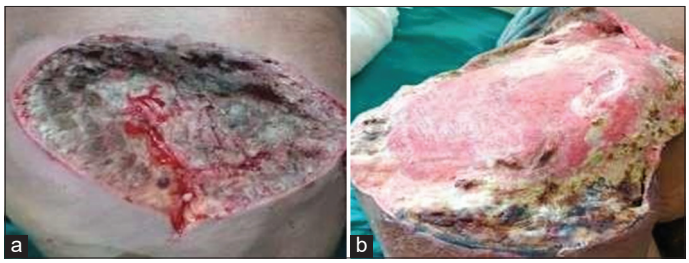

Figure 1: (a) Postfirst debridement; (b) Post-second debridement

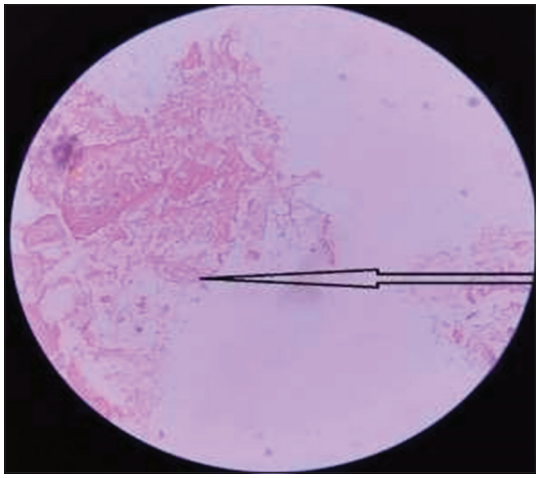

Figure 2: Histopathological examination of the patient

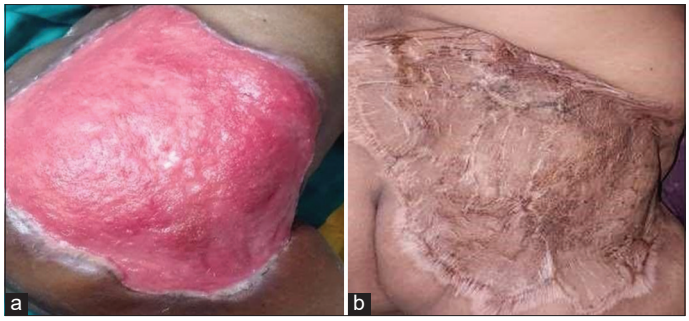

Figure 3: (a) Figure showing the patient after antifungal therapy; (b) The status of the patient at postoperative day 60

DISCUSSION

Mucormycosis is a rare opportunistic infection caused by fungi. Various case reports of cutaneous mucormycosis are available in the literature. A retrospective observational study conducted on 24 patients with cutaneous mucormycosis comparing the effect of concurrent antifungal therapy and debridement versus sequential initiation of antifungal therapy followed by debridement showed that concurrent antifungal therapy and debridement led to reinfection of freshly debrided margins. An aggressive debridement was essential, along with antifungal therapy. Age, previously unexplored wounds, associated co-morbidity, and trunk involvement can have detrimental effects on patient outcomes [7].

A Guide to Surgical Management of the primary cutaneous mucormycosis by Losee *et al*. in 2002 describes cutaneous mucormycosis in superficial and gangrenous form. Patients were managed by debridement, intravenous amphotericin B, and delayed surgical reconstruction. This resulted in the complete resolution of the infectious process without radical surgical excision [8]. A systematic review and meta-analysis on the contemporary management and clinical outcomes of mucormycosis published in 2019 advocates that surgery is fundamental to improving survival and must be accessible to all patients. Concomitant surgery and antifungal therapy will significantly lower 90-day mortality as compared to treatments with antifungals alone [9].

A prospective study of mucormycosis from a north Indian tertiary care center showed that the combination of surgery and medical treatment with amphotericin B was significantly better for patient survival as they found a survival rate of 92% in this study. This may be due to the fact that most patients were either in the rhinocerebral or cutaneous categories which were easily diagnosed and treated quickly. 100% survival was seen in cutaneous mucormycosis, which may be due to the aggressive measures

in early diagnosis and management [10]. The epidemiology, management, and outcome of patients with mucormycosis were studied in a multicentric prospective observational study in 2020 by Patel *et al*. Approximately 10% of total cases were of cutaneous mucormycosis. Surgical management was done for 79.6% of cutaneous cases. The survival rate was seen to be higher in combined surgical and medical management [11]. Another case report on cutaneous mucormycosis was reported in 2023 in north India by Panchal *et al*. and showed that aggressive repeated surgical debridement was done to manage the case, but antifungal therapy could be initiated in an early period, and hence, the patient could not be saved [12]. This emphasizes the need for concurrent early surgical and antifungal therapy in the management of cutaneous mucormycosis.

CONCLUSION

The successful management of cutaneous mucormycosis lies in the early initiation of antifungal therapy, which will definitely limit the frequency of surgical intervention and improve the prognosis of the patient, reducing the duration of hospital stay.

REFERENCES

1. Hernández JL, Buckley CJ. Mucormycosis. JAMA 2022;327:2447-8.
2. Rahman S, Montero MTV, Rowe K, Kirton R, Kunik F Jr. Epidemiology, pathogenesis, clinical presentations, diagnosis and treatment of COVID-19: A review of current evidence. Expert Rev Clin Pharmacol 2021;14:601-21.
3. Long B, Carius BM, Chavez S, Liang SY, Brady WJ, Koyfman A, *et al*. Clinical update on COVID-19 for the emergency clinician: Presentation and evaluation. Am J Emerg Med 2022;54:46-57.
4. Andresen D, Donaldson A, Choo L, Knox A, Klaassen M, Ursic C, *et al*. Multifocal cutaneous mucormycosis complicating polymicrobial wound infections in a tsunami survivor from Sri Lanka. Lancet 2005;365:876-8.
5. Miceli MH, Chandrasekar P. Safety and efficacy of liposomal amphotericin B for the empirical therapy of invasive fungal infections in immunocompromised patients. Infect Drug Resist 2012;5:9-16.
6. Elzein F, Albarrag A, Kalam K, Arafah M, Al-Baadani A, Eltayeb N, Al, *et al*. Mucormycosis: An 8-year experience of a tertiary care centre in Saudi Arabia. J Infect Public Health 2020;13:1774-9.
7. Brajesh V, Sharma S, Aggarwal A, Singh S, Mahendru S, Singh H, *et al*. Non-COVID-19 *Cutaneous mucormycosis* from a plastic surgical perspective. Indian J Plast Surg 2023;56:350-6.
8. Losee JE, Selber J, Vega S, Hall C, Scott G, Serletti JM. Primary cutaneous mucormycosis: Guide to surgical management. Ann Plast Surg 2002;49:385-90.
9. Jeong W, Keighley C, Wolfe R, Lee WL, Slavin MA, Chen SC, *et al*. Contemporary management and clinical outcomes of mucormycosis: A systematic review and meta-analysis of case reports. Int J Antimicrob Agents 2019;53:589-59.
10. Bala K, Chander J, Handa U, Punia RS, Attri AK. A prospective study of mucormycosis in north India: Experience from a tertiary care hospital. Med Mycol 2015;53:248-57.
11. Patel A, Kaur H, Xess I, Michael JS, Savio J, Rudramurthy S, *et al*. A multicentre observational study on the epidemiology, risk factors, management and outcomes of mucormycosis in India. Clin Microbiol Infect 2020;26:944.e9-15.
12. Panchal G, Sharma I, Bhandari A, Dubey R, Aggarwal M. Rare case of a lethal fungal necrotizing soft tissue infection involving anterior abdominal wall: Our experience at a zonal hospital. Indian J Surg 2023;85:716-8.

Funding: Nil; Conflicts of interest: Nil.

How to cite this article: Sebastian S, Malik P, Chanderbhan, Garg MK, Raj P. Aggressive debridement and early antifungal therapy in the management of cutaneous mucormycosis: A case report with review of literature. Indian J Case Reports. 2024;10(2):35-37.